A Watershed Conditions Report For the State of Kansas HUC 11030012 (Little Arkansas) Watershed

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Watershed Conditions Report
For
HUC 8 11030012 (Little Arkansas)

Prepared by
Kansas Department of Health and Environment (KDHE)
Nonpoint Source Section
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EXECUTIVE SUMMARY

This Watershed Conditions Report is designed to serve as a water quality "atlas", and is intended to provide stakeholders in water quality with a tool to assess the condition of water resources within their watershed. Surface water quality for HUC 8 11030012 streams and rivers is generally in fair to poor condition with the majority of the surface water bodies not supporting their designated uses. The primary pollutant concerns within HUC 8 11030012 streams and rivers are chloride, fecal coliform bacteria (FCB), and eutrophication. Chloride is a naturally occurring mineral found in Kansas lakes, streams, and groundwater. In high concentrations, chloride can cause deterioration of domestic plumbing, water heaters, and municipal water works. Nutrients such as phosphorous or nitrogen can cause an abundance of plants and algae. The excess nutrients creates a condition called eutrophication, which occurs when plant and algae populations increase in response to the nutrients, and levels of available oxygen decline. FCB is present in human and animal waste and serves as an indicator of potential disease causing organisms.

There are many small county and city lakes within the Huc 8 11030012 watershed. The primary pollutant concern for lakes/wetland areas within the watershed is eutrophication, dissolved oxygen (DO), and silt. Eutrophication is a natural process which creates conditions favorable for algae blooms and excess plant growth. This process is often accelerated by excess nutrient loading from the watershed. Low DO levels typically coincide with an abundance of algae, which may be caused by excess nutrients. An abundance of algae causes the population of decomposers to increase, which in turn uses up the oxygen in the stream or river. Silt loading is a result of erosion as the soil enters the lake and settles to the bottom. Silt decreases water clarity and eventually decreases water storage capacity. Silt also carries phosphorous into the reservoir, which can accelerate eutrophication.

Groundwater resources in HUC 8 11030012 include the High Plains and Dakota Aquifer along with Alluvial aquifers of the Little Arkansas River. Water from these aquifers is considered generally in good condition, but typically hard to very hard. Additionally, sodium and chloride content can increase with depth.

PURPOSE

The Watershed Conditions Report is designed to serve as a water quality "atlas" for a given watershed, and is intended to provide Watershed Stakeholders Committees (WSC) with a tool to assess the condition of water resources within their watershed.

BACKGROUND

The Clean Water Act mandates that States assess the quality of their waters and implement Total Maximum Daily Loads (TMDLs) for water bodies that do not meet their designated uses. The following is a summary of steps taken by the State of Kansas to comply with these requirements of the Clean Water Act.

The Kansas Department of Health and Environment (KDHE) prepared the Kansas Unified Watershed Assessment in 1998. This assessment classifies the State's watersheds into four categories. A Category I classification means the watershed is in need of restoration due to having water quality impairments or degradation of other natural resources related to an aquatic habitat, ecosystem health and other factors related to aquatic life resources. Category II watersheds are in need of protection. Category III are watersheds with pristine or sensitive aquatic system conditions on lands administered by federal, state, or tribal governments. Category IV watersheds are those for which there is insufficient data to make accurate classification. KDHE has assigned a restoration priority score to each Category I watershed.

As mandated by section 303(d) of the Clean Water Act, lakes and streams within the Category I watersheds, which do not meet water quality standards, are published biannually in the 303(d) list. Subsequently, lakes and streams which appear on the 303 (d) list are scheduled to have a Total Maximum Daily Load (TMDL) prepared. KDHE is currently preparing TMDLs for impaired stream segments located within the highest restoration priority watersheds.

To restore water quality within the Category I watersheds, KDHE recommends the implementation of a Watershed Restoration and Protection Strategy (WRAPS). The ultimate goal of the WRAPS process is to create and implement a plan to restore the health of water bodies that do not meet their water quality standards. Additionally, the WRAPS process will insure that water bodies that currently meet their water quality standards are protected.

KDHE recommends that the WRAPS process be implemented on a local level by a Watershed Stakeholders Committee (WSC). The WSC would have the responsibility of working with local and state agencies to develop a WRAPS plan. This plan should identify the following: public outreach methods; required monitoring activities based on water quality goals and outcomes; specific water quality problems; watershed coordinator/evaluator; actions to be taken to achieve water quality goals and outcomes; schedule for implementation of needed restoration measures; and funding needs.

Streams and Rivers

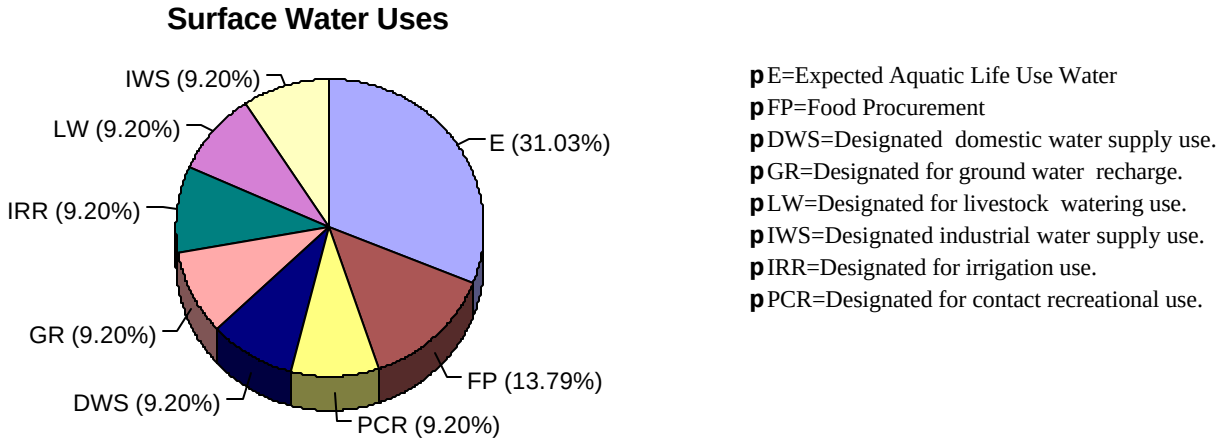
HUC 8 11030012

The Huc 8 11030012 watershed is ranked fourteenth in priority for watershed restoration throughout the state. According to the Unified Watershed Assessment, approximately 67% of the total miles of water in this watershed do not meet their designated uses. The Little Arkansas River, Emma Creek, and Sand Creek are a few of the larger streams and rivers in this watershed. See Attachment 1 for a map of streams and rivers in HUC 8 11030012.

Designated Uses

This watershed is mostly a drainage basin for the Little Arkansas River, however, smaller streams and creeks are also abundant throughout the area. There are approximately 205 public water supplies within the watershed, many of which draw water from the Little Arkansas River and it's alluvium. According to the Kansas Surface Water Register, the most common designated uses for streams and rivers in this watershed include: aquatic life uses, food procurement, industrial water supply, irrigation use, and contact recreational use.

Figure 1



TMDL/Contaminate Concerns

Streams and rivers throughout Kansas have been sub-divided into segments. By dividing the streams and rivers into segments they can be better analyzed and understood. A reach of river or stream may have segments which vary greatly in water quality, based on surrounding land uses. The information below describes conditions based on stream and river segments.

Surface waters not meeting their designated uses will require Total Maximum Daily Loads (TMDLs). Figure 2 shows that approximately 52% of the stream/river segments sampled need TMDLs. The primary pollutant concerns for this watershed's streams and rivers are chloride (Cl), eutrophication (E), fecal coliform bacteria (FCB), dissolved oxygen (DO), nutrients, silt loading, sulfate (SO4), and chlordane

(Chlord). As shown in Figure 3, approximately 25% of the impaired stream/river segments are impaired by chloride, 19% are impaired by eutrophication (E), 17% by FCB, 10% by DO, silt, and nutrients, 6% by sulfate, and 2% by chlordane.

Chloride is a naturally occurring mineral found in Kansas lakes, streams, and groundwater. In high concentrations, chloride can cause deterioration of domestic plumbing, water heaters, and municipal water works. Nutrients such as phosphorous or nitrogen can cause an abundance of plants and algae. The excess nutrients creates a condition called eutrophication, which occurs when plant and algae populations explode in response to the nutrients, and levels of available oxygen decline. Low levels of DO is considered an impairment because aquatic animals must then compete with organic material for oxygen. FCB is present in human and animal waste. It serves as an indicator of potential disease causing organisms. Silt loading is a result of erosion as the soil enters the rivers and lakes and settles to the bottom. Silt decreases water clarity and eventually decreases water storage capacity. Silt also carries phosphorous into the stream/river, which can accelerate eutrophication. Chlordane is an insecticide used primarily to treat termite infestations and is no longer authorized for use. Sulfate is a naturally occurring mineral that can cause taste and odor problems in drinking water.

Figure 2

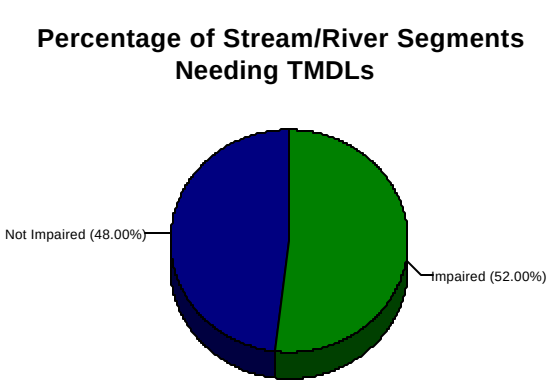
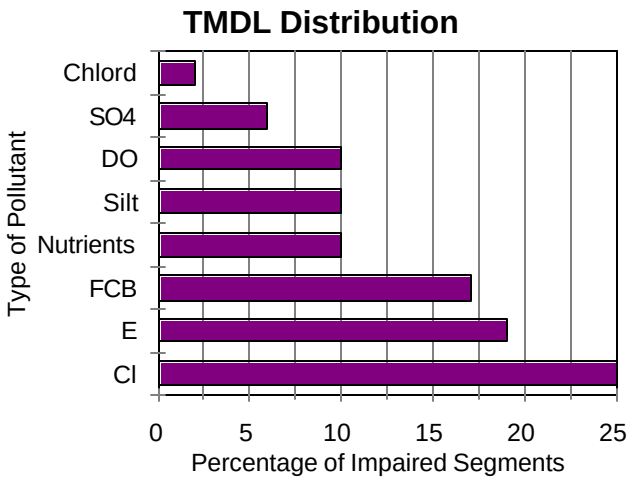


Figure 3



Potential Pollution Sources

This watershed has an unusually high amount of chloride in comparison to other watersheds throughout the state. This is partially due to the unique abundance of naturally occurring chloride deposits in parent material underlying this watershed. Additionally, low flow rates of surface water and irrigation use add to the problem. Potential sources of FCB include feedlots, wastewater treatment facilities, septic systems, and wildlife. Potential sources of sediment include construction sites, stream bank erosion, and row crop agriculture. Potential sources of excess nutrients include feedlots, wastewater treatment facilities, septic systems, wildlife, row crop agriculture, and grazingland.

Analyzing the land uses within this watershed helps to understand which land uses might have greater influences on the source of the impairments. Below are a list of the land uses in this watershed which can effect a stream or river segment. Grassland is considered grazingland for livestock.

- Urban Area....3%
- Row Crop....25%
- Grassland....70%
- Wooded area....1%
- Water area....1%

Feedlots: In Kansas, confined animal feeding operations (CAFOs) with greater than 300 animal units must register with KDHE. There are approximately 237 registered CAFOs located within HUC8 11030012 (this number, which is based on best available information, may be dated and subject to change). Waste disposal practices and waste water effluent quality are closely monitored by KDHE for these registered CAFOs to determine the need for runoff control practices or structure. Because of this monitoring, registered CAFOs are not considered a significant threat to water resources within the watershed. A portion of the State's livestock population exists on small unregistered farms. These small unregistered livestock operations may contribute a significant source of fecal coliform bacteria and nutrients, depending on the presence and condition of waste management systems and proximity to water resources.

Wastewater Treatment Facilities: There are approximately 23 municipal and industrial wastewater treatment facilities within the watershed (this number may be dated and subject to change). These facilities are currently regulated by KDHE under National Pollutant Discharge Elimination System (NPDES) permits. These permits specify the maximum amount of pollutants allowed to be discharged to the "waters of the State". Due to the chlorination processes involved in municipal waste treatment, these facilities are not considered to be a significant source of fecal coliform bacteria; however they may be a significant source of nutrients.

Septic Systems: There are currently thousands of septic systems within the watershed and this number is increasing. When properly designed, installed, and maintained, septic systems can act as an effective means of wastewater treatment. However, poorly maintained or "failing" septic systems can leach pollutants into nearby surface waters and groundwater. The exact number of failing septic systems within the watershed is unknown; however the number may be increasing due to the current trends in suburban development. Local Environmental Protection Programs and County health departments may provide excellent sources of information regarding the proper design, installation, and maintenance for septic systems.

Wildlife: Wildlife located throughout the watershed are not usually considered a significant source of nonpoint source pollutants. However, during seasonal migrations, concentrations of waterfowl can add significant amounts of fecal coliform bacteria and nutrients into surface water resources.

Row Crop Agriculture: As stated above, approximately 25% of the watershed's land is used for row crop agriculture. Row crop agriculture can be a significant source of nonpoint source pollution. Common pollutants from row crop agriculture include sediment, nutrients, pesticides, and fecal coliform bacteria. Row crop agriculture can be a source of FCB if manure is applied to the land as fertilizer. FCB can drain into surface water if manure is applied shortly before a rain shower or on frozen ground. Many

producers within the watershed regularly implement and maintain BMPs to limit the amount of nonpoint source pollutants leaving their farm. Some common BMPs include: the use of contour plowing; use of cover crops; maintaining buffer strips along field edges; and proper timing of fertilizer application.

Urban/Suburban Runoff: Many urban landscapes are covered by paved surfaces including roads, driveways, parking lots, and sidewalks. These surfaces are impermeable and tend to divert water into storm drains at high velocities. This increased flow velocity from urban areas can cause severe stream bank erosion in receiving water bodies. Additionally, urban and suburban runoff may carry other pollutants like petroleum hydrocarbons and heavy metals. Currently, the watershed is only about 3% urban. Limiting paved surfaces is the key to slowing urban nonpoint source pollution. The use of grass swales, open spaces, and storm water retention ponds are recommended to slow runoff in urban areas.

The watershed has an increasing population living in suburban areas. Residential landscapes are often designed with large turf areas which require high amounts of water and chemicals to maintain. The use of excessive amounts of fertilizers and lawn care chemicals in residential areas can contribute a significant amount of pollution to nearby water resources. Suburban nonpoint source pollution can be limited by: using less lawn fertilizers and chemicals; control of construction sites; proper disposal of pet waste; establishing large areas of native vegetation; and conserving the amount of water use for plant maintenance.

Lakes & Wetlands

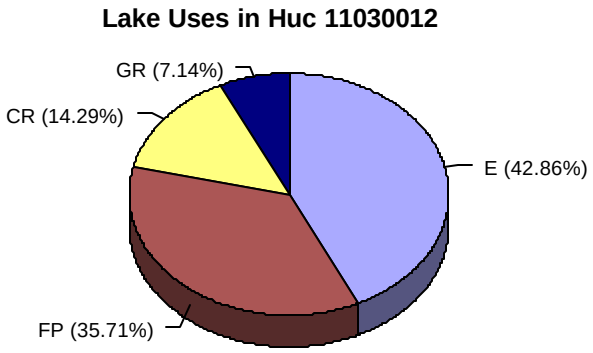
Huc 8 11030012 is the home to many city and county lakes along with one wetland area. Some of these include Newton City Park Lake, Inman Lake, and Harvey County West Park Lake. These lakes offer fishing, camping, trails for hiking, boating, and swimming. The wetland area, called the McPherson Wetland Area, is located in the northern portion of the watershed. See Attachment 2 for a map of lakes in HUC 8 11030012.

Designated Uses

According to the Surface Water Register, the majority of the lakes/wetland areas in this watershed are designated for expected aquatic life use, food procurement, contact recreational use, and groundwater recharge (Figure 4).

Figure 4

- E=Expected Aquatic Life Use Water
- FP=Food Procurement
- GR=Designated for ground water recharge.
- CR=Designated for contact recreational use.



TMDL/Contaminate Concerns

Surface waters not meeting their designated uses will require Total Maximum Daily Loads (TMDL)s. Currently 50% of the lakes/wetlands sampled in this watershed require TMDLs.

Of the impaired lakes/wetlands in this watershed, the primary pollutant concerns are eutrophication, silt, and DO. Approximately 67% of the impaired lakes/wetlands sampled are impaired by Eutrophication, and approximately 16% of the impaired lakes/wetlands are impaired by silt and/or DO. Eutrophication is a natural process which creates conditions favorable for algae blooms and excess plant growth. This process is often accelerated by excess nutrient loading from the watershed. Low DO levels typically coincide with an abundance of algae, which may be caused by excess nutrients. An abundance of algae causes the population of decomposers to increase, which in turn uses up the oxygen in the stream or river. Silt loading is a result of erosion as the soil enters the lake and settles to the bottom. Silt decreases water clarity and eventually decreases water storage capacity. Silt also carries phosphorous into the reservoir, which can accelerate eutrophication.

Potential Pollution Sources

Potential sources of excess nutrients include feedlots, wastewater treatment facilities, septic systems, wildlife, row crop agriculture and grazingland. Potential sources of sediment include construction sites, stream bank erosion, and row crop agriculture. Based on the watershed's land use percentages, the primary pollutant sources for nutrients would be feedlots. Additionally, municipal waste water treatment plants and septic systems may contribute significant amounts of nutrients into the watershed.

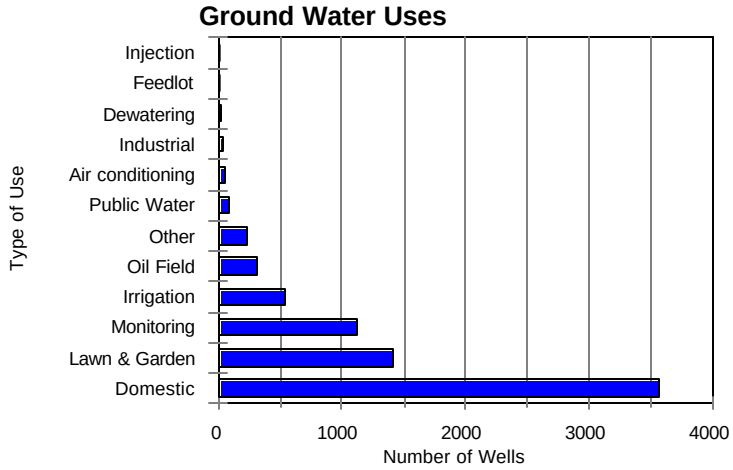
Groundwater

Major groundwater aquifers underlying this watershed include the High Plains and Dakota Aquifers along with alluvial aquifers of the Little Arkansas River and it's tributaries. See attachment 4 for a map of groundwater aquifers.

Designated Uses

There are approximately 7,406 groundwater wells located within the watershed. Water from these wells is used for domestic use, lawn and garden, groundwater monitoring, and irrigation purposes. See attachment 4 for a map of groundwater aquifers.

Figure 5



Aquifer Characteristics

High Plains Aquifer: The High Plains aquifer underlies this watershed. Water from this aquifer is often used for irrigation. This water is typically hard to very hard but in good condition with no dominating pollutants.

Dakota Aquifer: Portions of the Dakota aquifer exist in the north western portion of the watershed. Water from this aquifer is used for irrigation, public use, and rural-domestic water supply. Water from this aquifer is good; however chloride and sodium content increase with depth.

Alluvial Aquifer: Alluvial aquifers of the Little Arkansas River and it's tributaries exist throughout the watershed. Alluvial aquifers provide the primary water source for many public water supplies located within the watershed. Water quality in alluvial aquifers is generally good; however nitrates, minerals, pesticides, and bacteria can be pollutant concerns.

Potential Pollution Types and Sources

Common groundwater pollutants include: nitrates, chloride, sulfates, bacteria and atrazine. Nitrate impaired groundwater is perhaps the most prevalent groundwater contamination problem in the State.

Nitrate: Nitrate is a naturally occurring compound and is an essential component of all living matter. However, high concentrations of nitrate in drinking water can cause adverse health effects including "blue baby" syndrome. Sources of nitrate include municipal waste water treatment plant discharges, runoff from livestock operations, leaching of fertilizer from urban and agricultural areas, and failing septic systems.

Chloride: Chloride is a naturally occurring mineral found in Kansas lakes, streams, and groundwater. In high concentrations, chloride can cause deterioration of domestic plumbing, water heaters, and municipal water works. The primary source of chloride impacted groundwater is intrusion of salt water from deeper formations, often due to improperly constructed water wells which allow confined aquifers to come into contact with each other.

Sulfates: Sulfate is a naturally occurring mineral that can cause taste and odor problems in drinking water. Sulfates are dissolved into groundwater as the water moves through various sulfur containing rock formations.

Bacteria: Fecal coliform bacteria are found in the digestive systems of warm blooded animals. In the environment coliform bacteria is an indicator of potential disease causing organisms. Potential sources of bacteria contamination in groundwater include livestock facilities, septic systems, pets, and wildlife. Many wells are impacted by bacteria due to improper construction which allows water from the surface to funnel directly into the well.

Ammonia: Ammonia is a chemical which is toxic to fish and aquatic organisms. Sources of ammonia are livestock, septic tanks, fertilizer, municipal and industrial waste.

TSS: TSS stands for Total Suspended Solids which are particles such as soil, algae, and finely divided plant material suspended in water. Sources of TSS are soil erosion from cropland, stream banks, or construction sites, and municipal and industrial waste.

VOCs: Volatile Organic Compounds, also called purgeable organics, are components of fuels and solvents. They are ingredients in many household and industrial products. Sources of VOCs are leaking fuel storage tanks, trash dumps, and some agricultural pesticides.

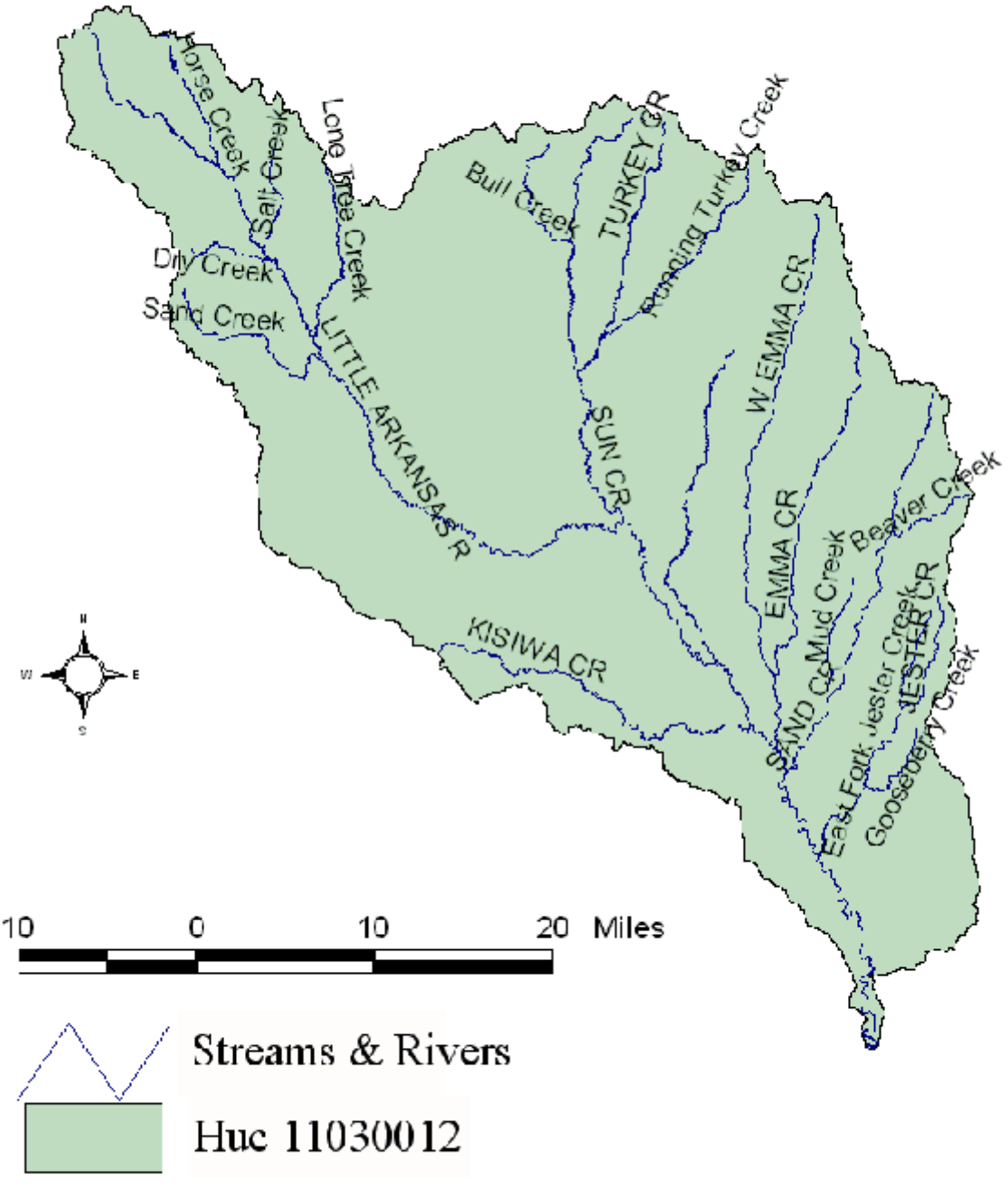
Iron: Iron is a naturally occurring element found in the soil throughout Kansas. It is an annoyance as it has an objectionable taste, causes a red stain to porcelain fixtures and laundry, and causes plumbing irritations.

Manganese: Manganese is a naturally occurring element and causes an unpleasant taste in drinking water, stains porcelain and laundry, and collects deposits in plumbing. It is naturally occurring throughout the soils in the state.

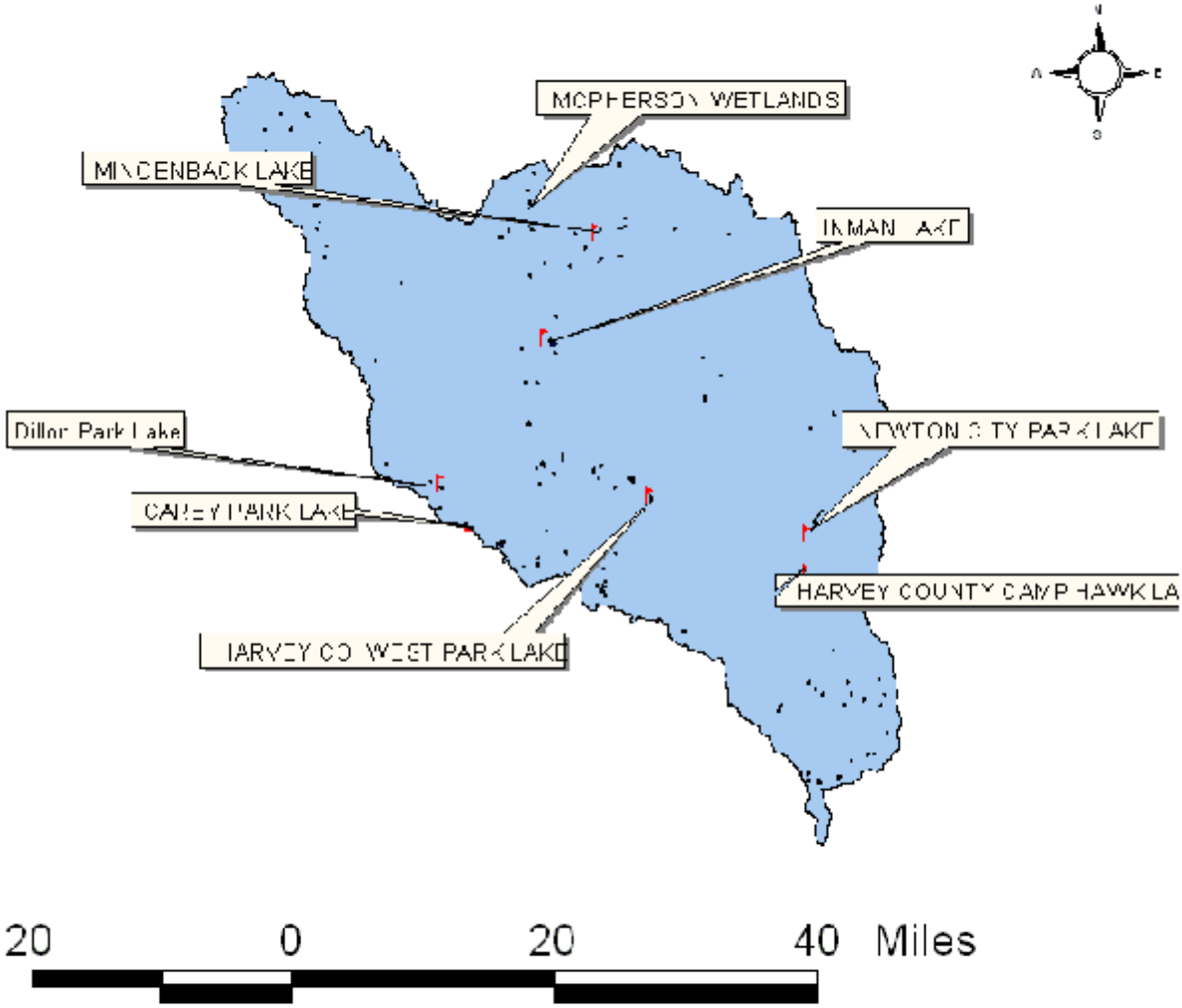
Attachment 1

Maps

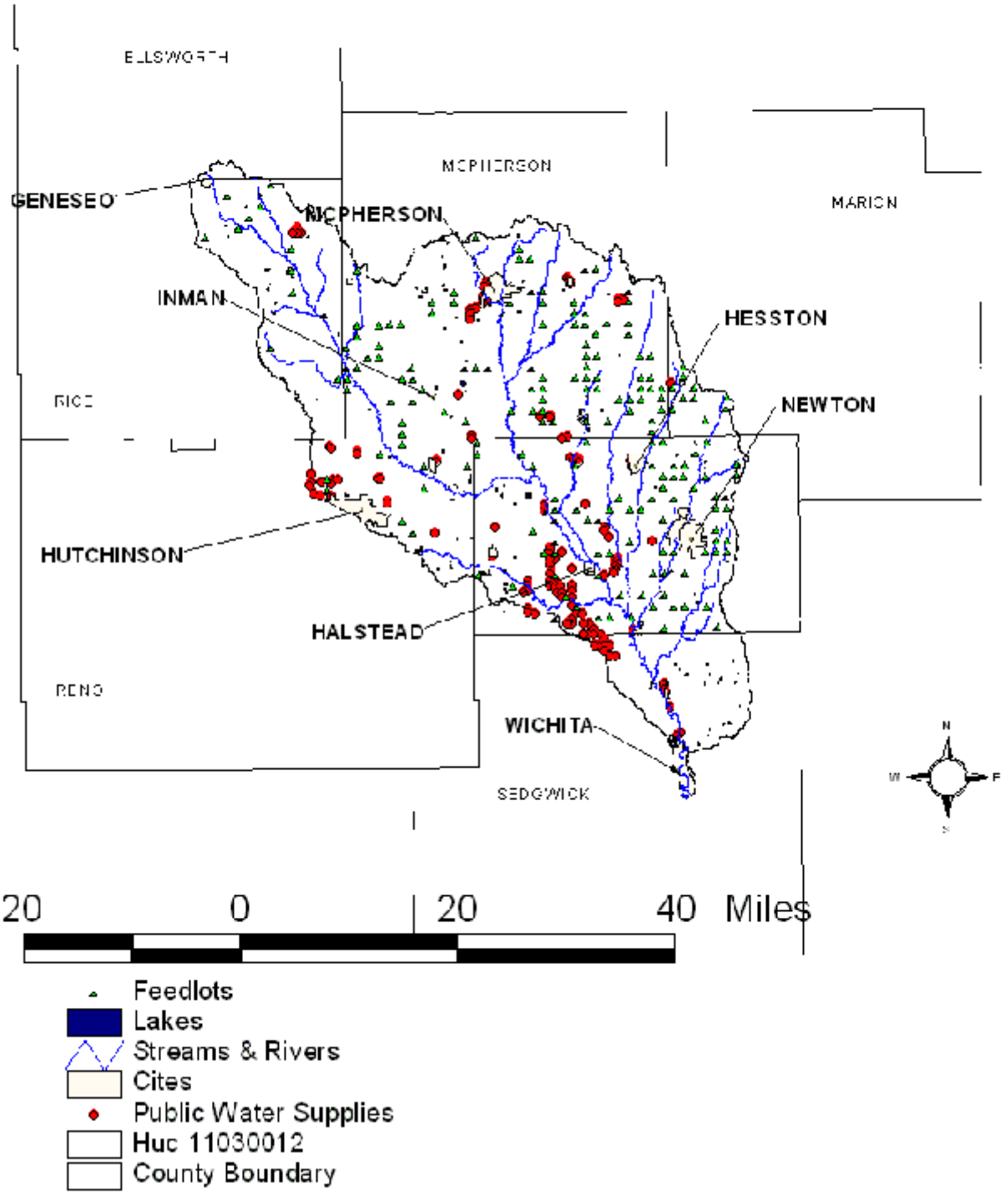
Huc -11030012- Little Arkansas Streams & Rivers



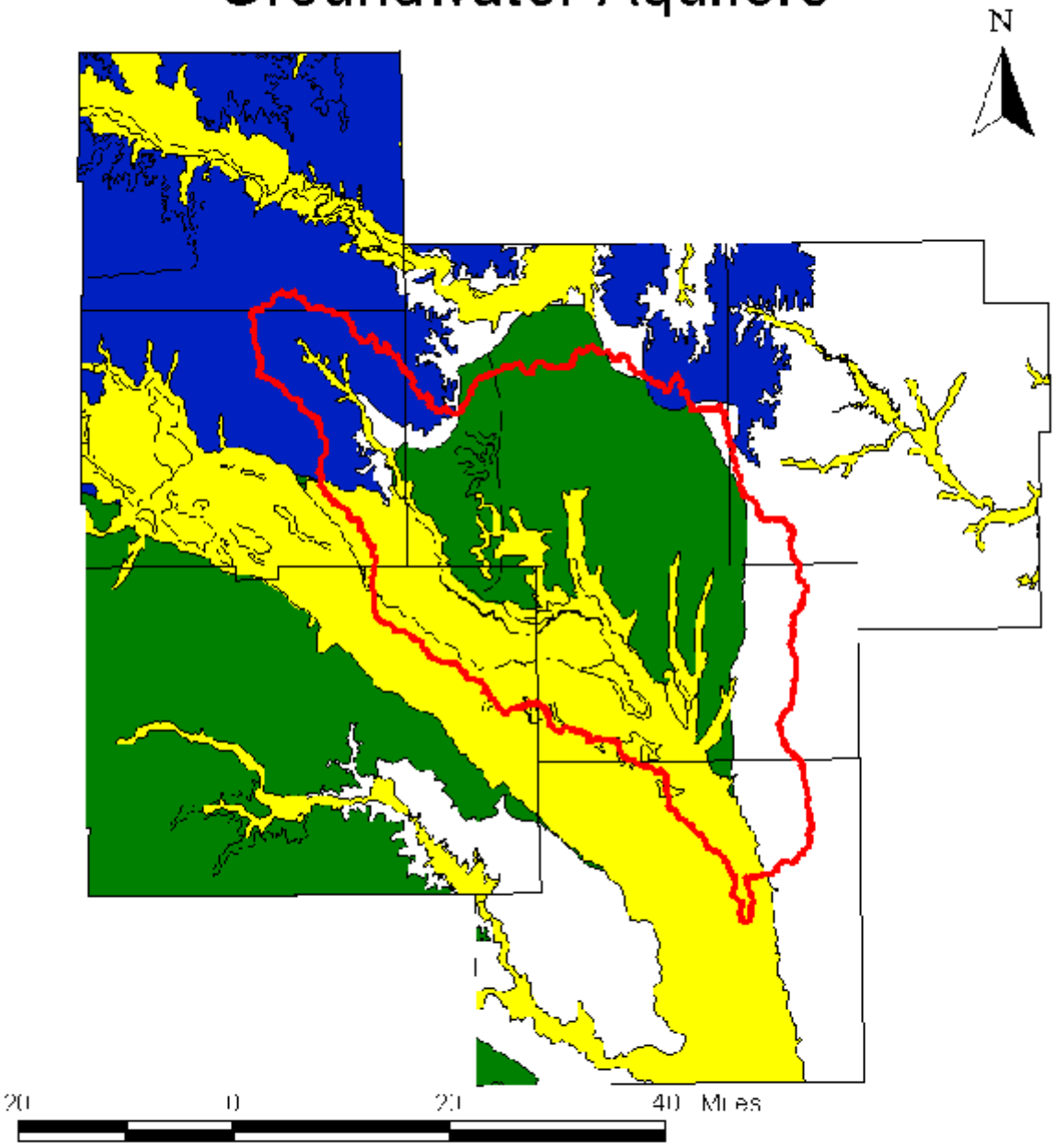
Huc -11030012- Little Arkansas
Lake Monitoring Sites



Huc -11030012- Little Arkansas Watershed Boundary



Huc 8 11030012 Little Arkansas Groundwater Aquifers



- Watershed Boundary
- County Boundary
- Alluvial Aquifer
- Dakota Aquifer
- High Plains Aquifer

KDHE
Bureau of Water
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Jaime Ziesemis